

Inspection of Pumping Plant Intake Screens

by
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INTRODUCTION

The impact of water withdrawal pumping plants on populations of anadromous and resident fish in the major rivers of the Columbia Basin continues to be a major concern to fisheries agencies. Mesh size (clear opening), screen condition, and water velocity through the fish screens are of interest because salmonid fry and fingerlings migrate past many of the withdrawal sites. In addition, early life stages of resident fish are often found in areas where water withdrawal intakes are located. Obviously, if screening criteria for a large number of intake structures were not met (e.g., mesh size opening too large, intake velocities too high, or screening poorly maintained), losses of young fish could be serious.

A survey, inventory, and inspection of fish protective facilities at water withdrawal sites on the Snake and Columbia Rivers was begun in 1979 by the National Marine Fisheries Service (NMFS) with initial funding provided by the Bonneville Power Administration (Swan et. al. 1980; Swan 1981). A number of withdrawal sites that were inspected in the 1979 survey and found to have discrepancies were inspected again a year later--all sites reinspected were found to be in the same or worse condition.

As a result of the surveys, the U.S. Army Corps of Engineers (CofE) issued notice to all operators of pumping plants located on the Snake and Columbia Rivers within the Walla Walla District that an inspection of their fish screening facilities would be completed during the summer of 1982 to verify compliance with the fish screening and intake velocity requirements of their pumping permits. CofE permits for pump intakes require screening having openings not in excess of 0.25 inch and an approach velocity to the intake not to exceed 1.0 ft per second.

In 1982, the CofE provided funding to develop a program for surveillance and monitoring of water withdrawal structures to ensure that fish protection facilities remain within permit stipulations. The NMFS conducted the inspections of the pumping sites on the Columbia, Snake, and Clearwater Rivers within the jurisdiction of the Walla Walla District of the CofE.

METHODS

Underwater inspections of fish screens were conducted in July-October 1982 by a team of NMFS SCUBA divers and were limited to the water intake fish screens on the Columbia, Snake, and Clearwater Rivers located within the CofE's Walla Walla District. Any discrepancies noted in the inspection were provided to the CofE for enforcement of permit stipulations.

RESULTS

The itemized results of the 1982 inspections are presented in Appendix A. A summation of the status of the fish protective facilities at the 95 withdrawal sites located within the CofE Walla Walla District is presented in Table 1. A total of 59 sites were within criteria, 34 sites had some type of discrepancy, and 2 were questionable. Eleven of the sites out of criteria in 1982 were also out of criteria when reinspected in 1979.

Table 1.--Number of sites inspected in the CofE Walla Walla District in 1982 and number which had no intake screening or existing screen materials were out of criteria.

Sites inspected	Condition					
	Questionable		Within criteria		Out of criteria	
(No.)	(No.)	(%)	(No.)	(%)	(No.)	(%)
95	2	2 ^{a/}	59	62	34	36

a/ The intake for one site was apparently covered with rock and could not be located, and divers were unable to dive at the other site.

Discrepancies noted during the diving inspections ranged from damaged screening in the form of cuts and tears in the screen fabric and over-size mesh openings to solid rust and collapse of screening or no screens at all.

The Walla Walla District of the CofE has initiated a program to follow up on permits issued for water withdrawals by periodic inspections of the intake screening. This cooperative effort by the NMFS and CofE to reinspect and correct discrepancies of fish screening provisions is an important step toward ensuring the adequacy of fish protective facilities at water withdrawals on the Snake and Columbia Rivers.

LITERATURE CITED

Swan, George A., Tommy G. Withrow, and Donn L. Park.

1980. Survey of fish protective facilities at water withdrawals on the Snake and Columbia Rivers. Fiscal year 1979 report of research financed by Bonneville Power Administration (Contract DE-A179-79BP10684).

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APPENDIX A

RECORD OF PUMPING PLANT
INTAKE SCREEN INSPECTIONS, 1982^{1/}

^{1/} Sites located on the Columbia, Snake, and Clearwater Rivers within the jurisdiction of the U.S. Army Corps of Engineers, Walla Walla District.

Inventory numbers are read as explained below:

INVENTORY NO.

Codes:

Clw = Clearwater River	R = right bank
Col = Columbia River	A = first site, same location
Snk = Snake River	B = second site, same location
L = left bank	C = third site, same location, etc.

Example:

Col 301.7 LB = A withdrawal site located on the Columbia River at river mile 301.7, the site is on the left bank (facing downstream), and it is the second site (facing downstream) at the approximate same river mile.

Condition of screening is expressed as follows:

OK	= Fish screen is in acceptable condition
D	= Discrepancies present in fish screening
Q	= A question exists about condition

RECORD OF PUMPING PLANT FISH SCREEN INSPECTION, 1982
U.S. Army Corps of Engineers, Walla Walla District

COLUMBIA RIVER

No.	Inventory no.	Date of inspection	Name	Condition	Comments
		(1982)			
1	Col 292.1L	8/27	McNary Golf Club	D	Screens OK, but rear panel fits loosley
2	Col 293.5R	8/27	Horse Heaven Farms	OK	Stainless steel
3	Col 295.0L	8/27	Conforth Rogers	D	One pump has 1" openings on mesh
4	Col 299.0R	8/29	Charlie Cox	OK	
5	Col 301.0L	8/29	Bradshaw	D	Two 3" holes in mesh
6	Col 301.5R	10/8	Irrigro	D	Two pumps have no screens, rest rusted solid and collapsed
7	Col 301.7LC	10/8	Royale Columbia Farms	D	Edges of all screens but one are loose
8	Col 301.7LB	10/8	Mikami	OK	
9	Col 301.7LA	10/8	Kosmos	D	One screen rusted out, one screen has fallen off
10	Col 304.5L	9/25	Unknown	D	One screen basket disconnected and laying upside down on bottom, two screens rusted away
11	Col 304.5R	8/29	Barbarosa Fielding	OK	
12	Col 312.0L	10/6	Port Kelly Yacht Club	OK	
13	Col 314.0L	10/6	Nedrow Farms, Inc.	OK	
14	Col 317.0L	9/30	Boise Cascade Papers	OK	
15	Col 320.0LB	--	US Dept Interior, So. Columbia Irrigation District	D	Unable to dive (operators say no screen)
16	Col 320.0LA	--	" " "	D	" " "
17	Col 321.7R	10/5	Phillips Pacific Chemical	D	Two 1/3" tears in mesh
18	Col 323.2R	9/24	Chevron Chem. Co.	OK	Stainless steel
19	Col 324.0R	9/24	Unknown	OK	Small 3-1/2" or 3" line w/foot valve
20	Col 325.5R	9/24	Two Rivers Park, Benton County	OK	
21	Col 326.5L	10/5	Port of Pasco	OK	Foot valve enclosed in tight timber crib

Record of Pumping Plant Fish Screen Inspection, 1982.--continued.

No.	Inventory no.	Date of inspection	Name	Condition	Comments
		(1982)			
22	Col 328.2R	10/5	City of Kennewick	OK	
23	Col 328.3L	10/5	City of Pasco	OK	
24	Col 328.8R	8/28	Cedars Restaurant	D	On Clover Island (2" line, plastic bleach bottle with holes, collapsed)
25	Col 330.1R	10/5	Benton County Parks	OK	Swim lagoon area
26	Col 330.2R	9/17	" " "	OK	Water Follies area
27	Col 331.1R	9/17	Columbia Park Golf Course	D	Hole in screen
28	Col 331.5L	--	Franklin County Irrigation District	Q	Unable to dive (screening condition unknown)
29	Col 333.5L	8/28	Chiawana Park	D	Mesh loose around end of pipe
30	Col 333.8R	8/23	Benton Country Park	OK	Campground
31	Col 334.0R	8/23	" " "	OK	Archery range
32	Col 335.9L	8/28	Franklin County Irrigation District	D	One pipe unscreened
33	Col 337.0L	8/28	Pre-Mix Concrete	D	Foot valve w/oversize holes
34	Col 337.1R	8/28	Sham-na-pum Golf Course	D	Screen frame does not fit closely to pipe
35	Col 337.9L	10/1	Horrigan	D	Screen rusted away and oversize openings
36	Col 338.5L	10/1	Walkley	D	Oversize openings
37	Col 339.0L	8/28	Ketchersid	OK	
38	Col 339.5L	8/28	"	OK	
39	Col 339.7L	8/28	"	OK	
40	Col 340.8R	10/6	City of Richland	OK	
41	Col 341.4RB	8/26	Dr. Lewis Zirkle	OK	Submersible pump
42	Col 341.4RA	8/26	James O. Henrie	D	Pipe cut off under water (probably to service check valve)
43	Col 341.5R	8/26	Milton Lewis	OK	
44	Col 341.6R	8/26	Ivan Huffman	OK	Submersible pump

Record of Pumping Plant Fish Screen Inspection, 1982.--continued.

No.	Inventory no.	Date of inspection	Name	Condition	Comments
		(1982)			
45	Col 343.3R	8/26	Port of Benton	D	Rocks under screen panels causes 3"-4" opening
46	Col 345.0R	8/26	PNI & HEDL 300 area	OK	
47	Col 348.2L	8/25	Unknown	D	Screen slipped off
48	Col 348.5L	8/25	Unknown	OK	
49	Col 353.0L	8/25	Mel McInturf	D	No screen
50	Col 353.0R	--	WPPS #2	OK	Stainless steel (did not dive due to current but have been on this site before)
51	Col 353.4L	8/25	Max Kinsie	OK	
52	Col 354.0L	8/25	Don Huntzinger	D	No screen
53	Col 355.0L	8/25	Unknown	D	2 cuts 2"-3" in mesh
54	Col 378.0R	10/26	Rockwell 181-D	OK	
55	Col 379.8R	10/26	AEC (N)	OK	
56	Col 389.0R	10/27	WPPS HGP	OK	
57	Col 381.9R	10/26	Rockwell 181-K East	D	About 4 holes in screen panels, one fish mesh panel missing
58	Col 383.5R	10/26	Rockwell 181-B	D	Minor holes and some deterioration

INVENTORY OF PUMPING PLANT FISH SCREEN INSPECTION
U.S. Army Corps of Engineers, Walla Walla District

SNAKE RIVER

No.	Inventory no.	Date of inspection	Name	Condition	Comments
		(1982)			
59	Snk 04.6L	9/24	U.S.B.R.	D	No screen (operator says not required originally)
60	Snk 06.2L	9/24	Arambel	OK	
61	Snk 06.3R	9/24	Myron Peterson	D	One screen rusted out
62	Snk 07.2L	9/24	Mehlenbacher	OK	
63	Snk 10.8L	10/12	Ice Harbor Irrigation	D	Screens loose at edges and seams
64	Snk 11.7R	10/07	Neff (Harris)	D	One screen pulled open at bottom
65	Snk 13.2L	10/12	Walkley	OK	
66	Snk 15.ORB	8/30	Big Flat, CofE	OK	
67	Snk 15.ORA	8/30	Big Flat, CofE	OK	
68	Snk 17.0L	10/12	K2H Farms, Inc.	OK	
69	Snk 19.4R	10/07	Klundt (Russel)	OK	
70	Snk 20.2R	8/30	T & R Farms	D	Screens completely deteriorated
71	Snk 22.5R	8/30	Lost Island, CofE	OK	
72	Snk 25.0L	8/30	Hollenbeke, CofE	OK	
73	Snk 47.0R	8/30	Skookum, CofE	OK	
74	Snk 55.0R	8/30	55 Mile Bar #1 CofE	OK	
75	Snk 55.5R	8/30	55 Mile Bar #2 CofE	OK	
76	Snk 76.5R	9/23	Ridpath, CofE	OK	
77	Snk 80.5L	9/23	New York Bar, CofE	OK	

Inventory of Pumping Plant Fish Screen Inspection - Snake River--continued

No.	Inventory no.	Date of inspection	Name	Condition	Comments
		(1982)			
78	Snk 85.ORB	9/23	Kukyendall	OK	
79	Snk 85.ORA	9/23	Riley	OK	
80	Snk 96.OR	9/23	Swift Bar, CofE	OK	
81	Snk 111.OR	10/01	Wawawai Park	OK	
82	Snk 132.5L	8/31	Chief Timothy Park	OK	Stainless steel
83	Snk 135.4R	8/31	Tidewater	OK	
84	Snk 140.OR	8/31	Siphon, CofE	OK	
85	Snk 141.5L	10/25	Washington Water Power	Q	Covered with rock, unable to find end of intake
86	Snk 142.1R	8/31	Elks	D	No screen
87	Snk 142.5RB	8/31	De Atley	D	Screen rusted out
88	Snk 142.5RA	8/31	Mountain West Enterprises	D	Screen rusted out

CLEARWATER RIVER

89	Clw 02.3L	8/31	Siphon, CofE	OK	Stainless steel
90	Clw 02.5R	8/31	Siphon, CofE	OK	Stainless steel
91	Clw 02.5L	8/31	Siphon, CofE	OK	Stainless steel
92	Clw 03.5L	10/01	Potlatch	OK	
93	Clw 04.OR	10/25	Hatwai Util. Assoc. Inc.	OK	
94	Clw 04.5R	10/01	City of Lewiston	OK	
95	Clw 04.5L	10/25	NCASI	OK	